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ABSTRACT

In fall 1969, the University of Minnesota Medical School implemented a new curriculum and the option for students of graduation in either 3 or 4 years as an experiment designed to decrease the shortage of practicing physicians. The purpose of this paper is to describe similarities and differences between 3 and 4 year graduates. The results of the study suggest that there are essentially nc differences between 3 and 4 year students in entrance scores, demographic data, academic performance during the first 2 years of medical school, or scores on a nationally standardized basic sciences certification examination. There may be a tendency for the 2 groups to differ on clinical competence or knowledge of clinical sciences; however, other factors exist that could explain these findings. (Author/HS)

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SIMILARITIES AND DIFFERENCES BETWEEN THREE AND FOUR YEAR MEDICAL SCHOOL GRADUATES*

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Traditionally the first stage in the professional education of a physician has consisted of four years of medical school after the baccalaureate degree. With the shortage of practicing physicians, especially in rural and ghetto areas, there has been considerable public pressure in recent years to increase the number of practicing physicians. One of the ways in which this demand is being met by medical schools is through the reduction of the curriculum from four to three years. A concomitant change by many medical schools has been a revision of the curriculum (Matlack, 1972).

In fall 1969, the University of Minnesota Medical School implemented both changes: a new curriculum and the option of graduation in three or four years. While some medical schools with three year programs require that all students matriculate in that period of time, Minnesota leaves the decision to the student, provided he is in satisfactory academic standing. The decision to graduate in three years must be made by fall of the third year in order to initiate arrangements for the internship which is traditionally taken the following year. The major difference between the three and four year programs at Minnesota is an additional year of clinical training.

The purpose of this paper is to describe similarities and differences between three and four year graduates.

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Method

Subjects. All subjects (N=165) entered medical school in fall 1969, and were the first class under the new curriculum. There were 145 (88%) males and 20 (12%) females. Mean age at entrance was 23.7 years. During the first year of medical school, 63% of the class stated an interest in early graduation; however, 19% (N=31) subsequently did graduate at the end of three years (June, 1972). Of these, 28 (90%) were male, and 3 (10%) were female.

Design and Instruments. Data gathered at time of admission to medical school included scores on the Medical College Admissions Test (MCAT) and Miller Analogies Test, the undergraduate grade point average, and biographical information. Personality and attitude tests administered at this point were the Minnesota Multiphasic Personality Inventory (MMPI), the Rokeach Dogmatism Scale, and the Eron Humanitarianism-Cynicism Scales. The Dogmatism Scale assesses general authoritarianism and belief structure (Rokeach, 1960). The Eron instrument was developed for purposes of measuring attitude change by medical students (Eron, 1955; 1958; Solkoff & Markowitz, 1967; Juan & Haley, 1970; Rosenberg & Weber, 1971).

Throughout the first and second years of medical school, scores on final exams in all required courses were collected for all subjects. At the end of the second year, the personality instruments were again administered with the exception of the MMPI. Students were required to take the Part I (Basic Sciences) Examination by the National Board of Medical Examiners.

Data gathered during the third and fourth years include ratings by clinical teachers using a standard 16-variable rating form applicable for all clinical electives. At the end of the third year, all students are required to take the Part II (Clinical Sciences) Examination by the National Board.

Results and Discussion

Objective and Biographical Results. Upon entrance to medical school, three year and four year students showed no significant differences on the following variables: GPA (science, non-science, total), MCAT scores (verbal, quantitative general information, science, total) Miller Analogies scores, or total number of college credits.

Of the biographical data, age was the only variable which showed a significant difference between the two groups. Twenty-six percent of the three year graduates were 25 or older; whereas, this was true of only 5% of the four year students. Other items included in the biographical form were: size of hometown, state of residency, undergraduate school, pre-med education (B.A., M.A., Ph.D.), number of children in student's family, number of older children, and education and occupation of both parents.

Academic Performance. With one exception there were no significant differences on final exam scores in the 8 required basic science courses in the first year. Three year graduates scored significantly higher than their four year colleagues in the first year Pharmacology course.

Of the 18 required basic-clinical science courses taught in the second year, four year students scored significantly higher in one course, Neurology. There were no differences in all other courses in the final exam scores.

The results of the National Board Part I Examination administered at the end of the second year showed no significant differences between the two groups on the subtest scores (Anatomy, Pathology, Biochemistry, Microbiology, Physiology, and Pharmacology) or the total score.

The curriculum for the third and fourth years consists of clinical electives, each of which lasts six weeks (five days per week, 8-12 hours per day). With the

approval of his advisor, the student can choose from a variety of electives in the clinical sciences (e.g., Medicine, Pediatrics, Surgery, etc.) in designing a program that corresponds to his professional interests.

In each elective, a 16-variable rating form is used to evaluate student performance. This method of subjective assessment based on tutor observation is feasible since approximately one to five students are assigned to a tutor at any one time. Tutor ratings are summarized in Tables 1 and 2 for clinical externships in Medicine, Pediatrics, Surgery, and Obstetrics/Gynecology. Student enrollment varied considerably in these four major clinical sciences with Medicine having the largest number of students. Differences in tutor ratings between three and four year students were not significant in any of the clinical areas with one exception: in the Medicine externship, three year students had mean ratings that were significantly higher (i.e., more competent) in (1) Organization of case presentations and (2) Use of library and literature in the study of patient's problems. Overall, there appears to be a slight trend for three year students to be rated slightly higher, but further data are needed before substantive conclusions can be drawn.

At the end of the third year, three year graduates had significantly higher scores on the National Board Part II examination in the areas of Medicine, Surgery, Obstetrics/Gynecology, Pediatrics, and on the total score. There were no differences in either the Psychiatry or Public Health-Preventive Medicine subtests. At least two interpretations are possible regarding these significant differences. First, the three year students could be demonstrating an actual superiority to their four year counterparts in medical knowledge as measured by the Part II exam. On the other hand, since all students were required to take Part II at the end of the third year, the four year students could have been less motivated to prepare

for and achieve on the exam since they also have the opportunity to take Part II again at the end of their fourth year (immediately before graduation). Thus another interpretation is that the significant differences are due to differences in motivation and with this factor held constant, three year students would not be expected to score significantly higher than four year students. Further research with additional groups of three and four year students is needed.

Personality and Attitude Data. The number of subjects for whom complete data were available varied with each of the personality and attitude instruments. Results reported in this analysis are based on data gathered under the same testing conditions, i.e., group testing of all students at the same points in time.

At entrance to medical school, students who subsequently graduated in three years differed significantly from four year students on three of sixteen MMPI scales. As shown in Table 3, mean scores for three-year graduates were significantly higher on the K Scale (Validity Scale) and Hy, Scale 3 (Clinical Scale), and lower on the "A" Neuroticism Scale (Research Scale). These three measures point to interpretive conclusions which are mutually supportive, indicating good adjustment, self-reliance, high self-esteem, little interpersonal wrangling, and the view that other people are trustworthy, responsible, and likable. Although both groups possess these traits, the three-year students scored in the more favorable directions.

The results of the two administrations of the Eron scales are summarized in Table 4. At entrance to medical school, three-year students scored significantly ($p < .05$) lower than four year students on the Cynicism Scale; the groups did not differ on the Humanitarianism Scale. By the end of the second year, both groups had increased significantly in cynicism; however, the cynicism mean score

of the three year students did not increase as much over the two year period as did the mean score for the four year students.

The Rokeach Dogmatism Scale was administered at the same times as the Eron scales, and the results are shown in Table 5. Upon entrance, the three-year students scored significantly ($p < .05$) lower. By the end of the second year, however, their mean scores had increased significantly ($p < .05$) to the extent that they did not differ from the four year students. One of the major elements of Rokeach's dogmatism construct is strength of belief systems, e.g., "belief in a great cause". In this context, the belief system could be interpreted as the students' goal of becoming a physician. Thus the mean scores in Table 5 could be regarded as indicating that three year students did not share the same level of commitment as four year students initially; however, the three year students increased in their dedication to this goal by the end of the second year.

In general, the combined results of the personality and attitude measures indicate that the three year students entered medical school with better overall adjustment and interpersonal effectiveness, less cynical, but also somewhat less dedicated to the goal at hand. The impact of the first two years of medical school on both groups is similar; however the three year group remain less cynical and seem to strengthen their goal orientation of becoming a physician compared with the four year group.

Implications

The results of this study suggest that there are essentially no differences between three and four year students in entrance scores, demographic data, academic performance during the first two years of medical school, or scores on a nationally standardized, basic sciences certification examination. There may be some tendency

for the two groups to differ on clinical competence or knowledge of clinical sciences; however, other factors exist which could explain these findings. Perhaps the most intriguing results have to do with personality and attitude measures. Further research is needed regarding the variables described here, and of the three and four year graduates as they progress through their post-graduate training (i.e., internship and residency programs) and into practice. Perhaps some of the potentially critical factors that have not been assessed in this study concern various aspects of self-selection, e.g., feelings of competence (valid or otherwise), personal maturity, financial pressures, etc.

These kinds of data would appear to have particular relevance to Medical School admission committees, advisors, and curriculum planners. Clearly, if medical schools respond to public and/or governmental pressures for more physicians by arbitrarily reducing their curricula to three years for all students rather than allowing a flexible program which includes some form of student option, then further in-depth research and evaluation are needed to assess the potential benefits and harm to the consumer.

TABLE 1

MEAN RATINGS BY CLINICAL TUTORS OF
THREE AND FOUR YEAR STUDENTS
IN MEDICINE AND PEDIATRICS CLINICAL EXTERNSHIPS

	MEDICINE		PEDIATRICS	
	Three Year Students (N=29)	Four Year Students (N=101)	Three Year Students (N=13)	Four Year Students (N=31)
BASIC SKILLS				
1. Rapport with patients	3.18	3.19	3.07	3.13
2. Histories (thorough, appropriate)	3.25	3.19	3.14	3.16
3. Physicals (thorough, appropriate, technically competent)	3.25	3.19	3.00	3.13
4. Patient records (accurate, well organized, clear)	3.41	3.21	3.14	3.13
5. Synthesizes information (to make a comprehensive assessment of patient's problems)	3.34	3.23	3.07	3.13
6. Appropriate of lab tests.	3.19	3.10	3.07	3.07
7. Appropriateness of therapy or treatment program	3.15	3.18	3.07	3.07
8. Case presentations (well organized)	3.46	3.24*	3.21	3.20
9. Carries out assigned tasks (responsible, reliable)	3.36	3.42	3.50	3.35
10. Use of library, literature (in study of patient's problems)	3.44	3.11*	3.14	3.26
OVERALL ABILITIES, ATTITUDES				
11. Initiative on ward	3.41	3.38	3.64	3.37
12. Emotional stability	3.34	3.30	3.29	3.28
13. Appearance	3.24	3.28	3.14	3.16
14. Relationship with ward team	3.24	3.27	3.43	3.26
15. Medical knowledge	3.24	3.17	3.00	3.13
16. Overall M. D. Potential (ability, judgment, attitude)	3.31	3.21	3.14	3.21

*Difference between Three and Four Year Students is significant at $p < .05$.

Rating based on the following scale: 4 = Outstanding, 3 = Very good, 2 = Adequate, 1 = Below adequate.

TABLE 2

MEAN RATINGS BY CLINICAL TUTORS OF
THREE AND FOUR YEAR STUDENTS
IN OBSTETRICS/GYNECOLOGY AND SURGERY

	OBSTETRICS/GYNECOLOGY		SURGERY	
	Three Year Students (N=18)	Four Year Students (N=81)	Three Year Students (N=12)	Four Year Students (N=37)
BASIC SKILLS				
1. Rapport with patients.	3.11	3.15	3.08	3.11
2. Histories (thorough, appropriate)	3.00	3.02	3.08	3.05
3. Physicals (thorough, appropriate, technically competent)	3.00	3.04	3.08	3.05
4. Patient records (accurate, well organized, clear)	3.06	3.04	3.08	3.05
5. Synthesizes information (to make a comprehensive assessment of patient's problems)	3.11	3.09	3.17	3.14
6. Appropriate of lab tests.	3.07	3.03	3.08	3.06
7. Appropriateness of therapy or treatment program	3.06	3.04	3.08	3.13
8. Case presentations (well organized)	3.00	3.06	3.08	3.11
9. Carries out assigned tasks (responsible, reliable)	3.28	3.14	3.33	3.19
10. Use of library, literature (in study of patient's problems)	3.11	3.08	3.08	3.08
OVERALL ABILITIES, ATTITUDES				
11. Initiative on ward	3.22	3.21	3.08	3.17
12. Emotional stability	3.17	3.10	3.25	3.11
13. Appearance	3.17	3.10	3.11	3.08
14. Relationship with ward team	3.22	3.15	3.17	3.14
15. Medical knowledge	3.22	3.10	3.00	3.08
16. Overall M.D. Potential (ability, judgment, attitude)	3.22	3.13	3.08	3.11

Rating based on the following scale: 4 = Outstanding, 3 = Very good, 2 = Adequate, 1 = Below adequate.

TABLE 3

MEAN SCORES ON THREE MMPI SCALES
FOR THREE AND FOUR YEAR STUDENTS*

MMPI Scale	Three Year Students (N=22)	Four Year Students (N=119)	Row Differences
K Scale (Validity Scale)	20.1	18.3	$p < .05$
Hy, Scale 3 (Clinical Scale)	21.5	20.1	$p < .05$
"A" Neuroticism Scale (Research Scale)	3.14	6.52	$p < .01$

*The values in the table are based on raw scores.

TABLE 4

MEAN SCORES ON ERON HUMANITARIANISM AND CYNICISM SCALES FOR THREE AND FOUR YEAR STUDENTS

HUMANITARIANISM SCALE

Testing Period	Three Year Students (N=20)	Four Year Students (N=83)	Row Differences
Entrance to Medical School	126.6	128.8	N.S.*
End of Second Year	124.4	128.0	N.S.
Column Differences	N.S.	N.S.	

CYNICISM SCALE

	Three Year Students	Four Year Students	Row Differences
Entrance to Medical School	116.0	125.6	$p < .05$
End of Second Year	123.7	133.7	$p < .05$
Column Differences	$p < .05$	$p < .001$	

*N.S. = Differences are not significant.

TABLE 5

MEAN SCORES ON THE DOGMATISM
SCALE FOR THREE AND FOUR YEAR STUDENTS

Testing Period	Three Year Students (N=20)	Four Year Students (N=83)	Row Differences
Entrance to Medical School	123.3	132.1	$p < .05$
End of Second Year	129.4	132.0	N.S.
Column Differences	$p < .05$	N.S.	

N.S. = Differences are not significant.

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